IV. CHEMICAL RELEASE AND TRANSFER PROFILE

This section is designed to provide background information on the pollutant releases that are reported by this industry. The best source of comparative pollutant release information is the Toxic Release Inventory System (TRI). Pursuant to the Emergency Planning and Community Right-to-Know Act, TRI includes self-reported facility release and transfer data for over 600 toxic chemicals. Facilities within SIC Codes 20-39 (manufacturing industries) that have more than 10 employees, and that are above weight-based reporting thresholds are required to report TRI on-site releases and off-site transfers. The information presented within the sector notebooks is derived from the most recently available (1993) TRI reporting year (which then included 316 chemicals), and focuses primarily on the on-site releases reported by each sector. Because TRI requires consistent reporting regardless of sector, it is an excellent tool for drawing comparisons across industries.

Although this sector notebook does not present historical information regarding TRI chemical releases over time, please note that in general, toxic chemical releases have been declining. In fact, according to the 1993 Toxic Release Inventory Data Book, reported releases dropped by 42.7% between 1988 and 1993. Although on-site releases have decreased, the total amount of reported toxic waste has not declined because the amount of toxic chemicals transferred off-site has increased. Transfers have increased from 3.7 billion pounds in 1991 to 4.7 billion pounds in 1993. Better management practices have led to increases in off-site transfers of toxic chemicals for recycling. More detailed information can be obtained from EPA's annual Toxics Release Inventory Public Data Release book (which is available through the EPCRA Hotline at 1-800-535-0202), or directly from the Toxic Release Inventory System database (for user support call 202-260-1531).

Wherever possible, the sector notebooks present TRI data as the primary indicator of chemical release within each industrial category. TRI data provide the type, amount, and media receptor of each chemical released or transferred. When other sources of pollutant release data have been obtained, these data have been included to augment the TRI information.

TRI Data Limitations

The reader should keep in mind the following limitations regarding TRI data. Within some sectors, the majority of facilities are not subject to TRI reporting because they are not considered manufacturing industries, or because they are below TRI reporting thresholds. Examples are the mining, dry cleaning, printing, and transportation equipment cleaning sectors. For these sectors, release information from other sources has been included.

The reader should also be aware that TRI "pounds released" data presented within the notebooks is not equivalent to a "risk" ranking for each industry. Weighting each pound of release equally does not factor in the relative toxicity of each chemical that is released. The Agency is in the process of developing an approach to assign toxicological weightings to each chemical released so that one can differentiate between pollutants with significant differences in toxicity. As a preliminary indicator of the environmental impact of the industry's most commonly released chemicals, the notebook briefly summarizes the toxicological properties of the top five chemicals (by weight) reported by each industry.

Definitions Associated With Section IV Data Tables

General Definitions

SIC Code -- the Standard Industrial Classification (SIC) is a statistical classification standard used for all establishment-based Federal economic statistics. The SIC codes facilitate comparisons between facility and industry data.

TRI Facilities -- are manufacturing facilities that have 10 or more full-time employees and are above established chemical throughput thresholds. Manufacturing facilities are defined as facilities in Standard Industrial Classification primary codes 20-39. Facilities must submit estimates for all chemicals that are on the EPA's defined list and are above throughput thresholds.

Data Table Column Heading Definitions

The following definitions are based upon standard definitions developed by EPA's Toxic Release Inventory Program. The categories below represent the possible pollutant destinations that can be reported.

RELEASES -- are an on-site discharge of a toxic chemical to the environment. This includes emissions to the air, discharges to bodies of water, releases at the facility to land, as well as contained disposal into underground injection wells.

Releases to Air (Point and Fugitive Air Emissions) -- Include all air emissions from industry activity. Point emissions occur through confined air streams as found in stacks, ducts, or pipes. Fugitive emissions include losses from equipment leaks, or evaporative losses from impoundments, spills, or leaks.

Releases to Water (Surface Water Discharges) - encompass any releases going directly to streams, rivers, lakes, oceans, or other bodies of water. Any estimates for stormwater runoff and non-point losses must also be included.

Releases to Land -- includes disposal of waste to on-site landfills, waste that is land treated or incorporated into soil, surface impoundments, spills, leaks, or waste piles. These activities must occur within the facility's boundaries for inclusion in this category.

Underground Injection -- is a contained release of a fluid into a subsurface well for the purpose of waste disposal.

TRANSFERS -- is a transfer of toxic chemicals in wastes to a facility that is geographically or physically separate from the facility reporting under TRI. The quantities reported represent a movement of the chemical away from the reporting facility. Except for off-site transfers for disposal, these quantities do not necessarily represent entry of the chemical into the environment.

Transfers to POTWs -- are wastewaters transferred through pipes or sewers to a publicly owned treatments works (POTW). Treatment and chemical removal depend on the chemical's nature and treatment methods used. Chemicals not treated or destroyed by the POTW are generally released to surface waters or landfilled within the sludge.

Transfers to Recycling -- are sent off-site for the purposes of regenerating or recovering still valuable materials. Once these chemicals have been recycled, they may be returned to the originating facility or sold commercially.

Transfers to Energy Recovery -- are wastes combusted off-site in industrial furnaces for energy recovery. Treatment of a chemical by incineration is not considered to be energy recovery.

Transfers to Treatment -- are wastes moved off-site for either neutralization, incineration, biological destruction, or physical separation. In some cases, the chemicals are not destroyed but prepared for further waste management.

Transfers to Disposal -- are wastes taken to another facility for disposal generally as a release to land or as an injection underground.

IV.A. EPA Toxic Release Inventory for the Stone, Clay, Glass, and Concrete Products Sector

Facilities within SIC 32 reported releases of over 100 toxic chemicals in 1993, including solvents, acids, heavy metals, and other compounds. The concrete and cement industries reported high volumes of solvent releases. Trichloroethylene and 1,1,1,-trichloroethane together accounted for more than a third of total releases from the concrete industry. The flat glass industry reported a relatively low level of releases, with sulfuric acid accounting for more than two-thirds of the industry total. Releases from the fiberglass industry included significant amounts of acids, heavy metals, and solvents.

The TRI database contains a detailed compilation of self-reported, facility-specific chemical releases. The top reporting facilities for this sector are listed below. Facilities that have reported only the SIC codes covered under this notebook appear in Exhibit 9. Exhibit 10 contains additional facilities that have reported the SIC code covered within this report, and one or more SIC codes that are not within the scope of this notebook. Therefore, Exhibit 10 includes facilities that conduct multiple operations — some that are under the scope of this notebook, and some that are not. Currently, the facility-level data do not allow pollutant releases to be broken apart by industrial process. Exhibit 11 presents TRI reporting data for 1993 for SIC 32 by state. Exhibit 12-13 present SIC 32 TRI releases and transfers for 1993.

Exhibit 9
Top 10 TRI Releasing Stone, Clay, Glass, and Concrete Facilities (SIC 32)

Rank	Total TRI Releases in Pounds	Facility Name	City	State
1	6,528,036	Engelhard Corp.	Jackson	MS
2	1,336,954	Corning Inc., Canton Plant	Canton	NY
3	1,309,956	Owens-Corning	Newark	OH
4	1,244,025	Knauf Fiber Glass	Shelbyville	IN
5	760,050	Owens-Corning Fiberglass Corp.	Kansas City	KS
6	659,598	Dana Corp., Victor Products Div.	Robinson	IL
7	641,598	Schuller Intl. Inc., Plant 08	Defiance	OH
8	556,811	Lockheed Aeronautical Sys. Co.	Marietta	GA
9	497,630	Owens-Corning Fiberglass	Amarillo	TX
10	426,470	Schuller Intl. Inc.	Winder	GA

Source: US EPA, Toxics Release Inventory Database, 1993.

Exhibit 10
Top 10 TRI Releasing Stone, Clay, Glass and Concrete Products Facilities

SIC Codes	Total TRI Releases in Pounds	Facility Name	City	State
3321, 3274	10,618,719	Inland Steel Co.	East Chicago	IN
3295	6,528,036	Engelhard Corp.	Jackson	MS
3295, 3274, 3559	2,135,035	Marine Shale Processors Inc.	Amelia	LA
3714, 3231	1,727,400	Harman Automotive Inc.	Bolivar	TN
3861, 3291, 2672	1,389,650	3M Medical Imaging Sys.	White City	OR
3229	1,336,954	Corning Inc. Canton Plant	Canton	NY
3296	1,309,956	Owens-Corning	Newark	OH
3296	1,244,025	Knauf Fiber Glass	Shelbyville	IN
3296	760,050	Owens-Corning Fiberglass Corp. KC	Kansas City	KS
3293	659,598	Dana Corp. Victor Products Div.	Robinson	IL

Source: US EPA, Toxics Release Inventory Database, 1993.

Note: Being included on this list does not mean that the release is associated with non-compliance with environmental laws.

Exhibit 11
TRI Reporting Stone, Clay, Glass, and Concrete Products Facilities (SIC 32) by State

State	Number of Facilities	State	Number of Facilities
AL	18	ND	1
AR	14	NE	3
AZ	4	NH	2
CA	45	NJ	16
CO	13	NY	32
CT	4	OH	69
FL	9	OK	12
GA	20	OR	3
IA	7	PA	52
ID	1	PR	2
IL	24	RI	1
IN	25	SC	12
KS	12	SD	2
KY	17	TN	18
LA	6	TX	40
MA	4	UT	5
MD	5	VA	15
ME	2	VT	2
MI	28	WA	10
MN	8	WI	7
MO	16	WV	10
MS	10	WY	1
NC	27		

Source: US EPA, Toxics Release Inventory Database, 1993.

Exhibit 12
Releases for Stone, Clay, Glass, and Concrete Products Facilities (SIC 32) in TRI, by Number of Facilities (Releases Reported in Pounds/Year)

Chemical Name	#/Facilities Reporting Chemical	Fugitive Air	Point Air	Water Discharges	Under-ground Injection	Land Disposal	Total Releases	Average Releases per Facility
Chromium Compounds	107	15815	14747	2734	0	89301	122597	1146
Barium Compounds	96	14492	167275	1733	0	45198	228698	2382
Manganese Compounds	91	9382	2846	765	0	254194	267187	2936
Sulfuric Acid	63	1969	369701	0	6521124	130000	7022794	111473
Ammonia	61	346223	5155539	102816	0	71150	5675728	93045
Zinc Compounds	56	6620	19231	39019	0	186150	251020	4483
Lead Compounds	51	5245	69270	1895	0	233617	310027	6079
Formaldehyde	49	198841	2426028	4774	0	111488	2741131	55941
Hydrochloric Acid	48	17520	2049039	207	45000	64860	2176626	45346
Phenol	43	27935	912472	10760	0	14112	965279	22448
Chromium	41	1352	3005	5	0	47397	51759	1262
Phosphoric Acid	41	1351	3620	1160	0	29838	35969	877
Styrene	41	423151	63833	0	0	81000	567984	13853
Acetone	39	204221	130784	0	0	0	335005	8590
Dichloromethane	38	157173	179356	0	0	0	336529	8856
Xylene (Mixed Isomers)	38	253985	224303	250	0	0	478538	12593
Methyl Ethyl Ketone	37	76042	151035	0	0	0	227077	6137
Toluene	37	196552	816648	0	0	0	1013200	27384
Manganese	32	5013	4406	250	0	272018	281687	8803
Ethylene Glycol	30	1015	41851	0	0	31915	74781	2493
Glycol Ethers	30	4626	106982	0	0	8858	120466	4016
Methanol	27	262825	481616	0	0	23000	767441	28424
Hydrogen Fluoride	25	3780	504539	113	0	20	508452	20338
Methyl Isobutyl Ketone	23	2677	55029	0	0	0	57706	2509
Ethylbenzene	21	3779	6844	0	0	0	10623	506
Tetrachloroethylene	19	31699	65310	5	0	0	97014	5106
1,1,1-Trichloroethane	19	73917	310431	0	0	0	384348	20229
Lead	18	1382	8627	41	0	20901	30951	1720
Antimony Compounds	16	1491	4684	702	0	0	6877	430
Ammonium Sulfate (Solution)	15	106	66781	0	0	9555	76442	5096
Barium	14	250	14110	260	0	5	14625	1045
Aluminum (Fume Or Dust)	11	500	761	0	0	750	2011	183
Nickel Compounds	11	790	1623	297	0	82636	85346	7759
Chlorine	10	1850	40990	21004	0	0	63844	6384

Methylenebis (Phenylisocyanate)	9	1	0	0	0	1390	1391	155
	8	44744	16562	5	0	2411	63722	7965
Nickel	8	532	860	0	0	8053	9445	1181
Nitric Acid	8	27760	20615	250	0	0	48625	6078
1,2,4-Trimethylbenzene	8	7330	13187	0	0	0	20517	2565
Benzene	7	369	195	0	0	0	564	81
Copper Compounds	7	5033	1007	279	0	2821	9140	1306
N-Butyl Alcohol	7	19036	17700	0	0	0	36736	5248
Trichloroethylene	7	6431	396368	0	0	0	402799	57543

Source: US EPA, Toxics Release Inventory Database, 1993.

Exhibit 12 (cont'd)
Releases for Stone, Clay, Glass, and Concrete Products Facilities (SIC 32) in TRI, by Number of Facilities (Releases Reported in Pounds/Year)

Chemical Name	#/Facilities Reporting Chemical	Fugitive Air	Point Air	Water Discharges	Under-ground Injection	Land Disposal	Total Releases	Average Releases per Facility
Aluminum Oxide (Fibrous Form)	6	590	500	250	0	250	1590	265
Arsenic Compounds	6	360	10969	422	0	5	11756	1959
Diethanolamine	6	1250	47375	0	0	12039	60664	10111
Ammonium Nitrate (Solution)	5	121126	5	0	0	0	121131	24226
Cadmium Compounds	5	13	13	93	0	0	119	24
Cobalt Compounds	5	5	1832	0	0	0	1837	367
O-Xylene	5	2915	3315	0	0	0	6230	1246
Chloroform	4	264	73	0	0	0	337	84
Cobalt	4	27	0	0	0	0	27	7
Copper	4	252	512	254	0	306	1324	331
Di(2-Ethylhexyl) Phthalate	4	0	275	0	0	0	275	69
Methyl Methacrylate	4	654	70	0	0	0	724	181
1,4-Dichlorobenzene	4	850	81590	0	0	0	82440	20610
Asbestos (Friable)	3	265	938	250	0	67367	68820	22940
Butyl Benzyl Phthalate	3	250	1750	0	0	0	2000	667
Creosote	3	5	240	0	0	0	245	82
Naphthalene	3	3650	70625	0	0	0	74275	24758
Sec-Butyl Alcohol	3	4371	468	0	0	0	4839	1613
Zinc (Fume Or Dust)	3	0	255	0	0	0	255	85
2-Ethoxyethanol	3	1205	55805	0	0	0	57010	19003
Antimony	2	5	5	6	0	0	16	8
Biphenyl	2	50	1	0	0	0	51	26
Chlorobenzene	2	11	115	0	0	0	126	63
Cumene	2	33	32	0	0	0	65	33
Cyclohexane	2	250	255	0	0	0	505	253
Decabromodiphenyl Oxide	2	5	5	45	0	0	55	28
Freon 113	2	30642	0	0	0	0	30642	15321
Isopropyl Alcohol (Manufacturing	0	933	673	260	0	0	S	2
M-Xylene	2	4005	750	0	0	0	4755	2378
Propylene	2	5	5	0	0	0	10	5
Titanium Tetrachloride	2	23	0	0	0	0	23	12
1,2-Butylene Oxide	2	565	100	0	0	0	665	333
1,4-Dioxane	2	250	254	0	0	0	504	252
2-Methoxyethanol	2	5	230	0	0	0	235	118
Acetonitrile	1	1500	260	0	0	0	1760	1760
Aliphatic Alcohol	1	0	320	0	0	0	320	320
Allyl Alcohol	1	5	5	0	0	0	10	10
Aniline	1	0	0	0	0	0	0	0

Anthracene	1	5	0	0	0	250	255	255
Butyl Acrylate	1	0	250	0	0	0	250	250
Butyraldehyde	1	0	0	0	0	0	0	0
Cresol (Mixed Isomers)	1	113	108	0	0	0	221	221
Cyanide Compounds	1	5	0	0	0	0	5	5

Source: US EPA, Toxics Release Inventory Database, 1993.

Exhibit 12 (cont'd)
Releases for Stone, Clay, Glass, and Concrete Products Facilities (SIC 32) in TRI, by Number of Facilities (Releases Reported in Pounds/Year)

Chemical Name	#/Facilities Reporting Chemical	Fugitive Air	Point Air	Water Discharges	Under-ground Injection	Land Disposal	Total Releases	Average Releases per Facility
Diaminotoluene (Mixed Isomers)	1	4	4	0	0	0	8	8
Dibutyl Phthalate	1	0	0	0	0	750	750	750
Dichlorobenzene (Mixed Isomers)	1	6	106	0	0	0	112	112
Diethyl Phthalate	1	0	1	0	0	0	1	1
Dimethyl Phthalate	1	180	1	0	0	0	181	181
Ethyl Acrylate	1	5	5	0	0	0	10	10
Ethylene Oxide	1	5	0	0	0	0	5	5
Fluometuron	1	5	5	0	0	0	10	10
Isobutyraldehyde	1	5	5	0	0	0	10	10
M-Cresol	1	0	1	0	0	0	1	1
Methyl Acrylate	1	0	0	0	0	0	0	0
Methyl Tert-Butyl Ether	1	5	5	0	0	0	10	10
Nitrobenzene	1	6	100	0	0	0	106	106
P-Xylene	1	3400	920	0	0	0	4320	4320
Polychlorinated Biphenyls	1	0	0	0	0	0	0	0
Pyridine	1	1	1	0	0	0	2	2
Selenium	1	0	0	0	0	0	0	0
Selenium Compounds	1	0	32149	0	0	0	32149	32149
Tert-Butyl Alcohol	1	250	5	0	0	0	255	255
Toluenediisocyanate (Mixed Isomers)	1	3	2	0	0	0	5	
Trichlorofluoromethane	1	4439	0	0	0	0	4439	4439
Vinyl Acetate	1	5	5	0	0	0	10	10
Totals	**634**	**2,649,586**	**15,253,103**	**190904**	**6,566,124**	**1903,605**	**26,561,456**	**41,895**

Source: US EPA, Toxics Release Inventory Database, 1993.

Exhibit 13
Transfers for Stone, Clay, Glass, and Concrete Products Facilities (SIC 32) in TRI, by Number of Facilities (Transfers Reported in Pounds/Year)

Chemical Name	# Facilities Reporting Chemical	POTW Disharges	Disposal	Recycling	Treatment	Energy Recovery	Total Transfers	Average Transfers per Facility
Chromium Compounds	1612846	2082	692929	883908	33927	.	107	15073
Barium Compounds	1568224	11856	1495116	52133	9119	.	96	16336
Manganese Compounds	64675	11458	51111	204	1902	.	91	711
Sulfuric Acid	77905	17791	.	.	60114	.	63	1237

Ammonia	239910	207712	30481	.	1715	2	61	3933
Zinc Compounds	1202327	5543	879399	149844	167291	.	56	21470
Lead Compounds	3584112	2818	2455421	965797	137787	22289	51	70277
Formaldehyde	137551	72215	39068	.	20348	5920	49	2807
Hydrochloric Acid	201595	64335	.	.	137260	.	48	4200
Phenol	86292	11194	43648	.	19619	11831	43	2007
Chromium	2443465	0	1907814	519021	16630	.	41	59597
Phosphoric Acid	60849	9718	51131	.	.	.	41	1484

Source: US EPA, Toxics Release Inventory Database, 1993.

Exhibit 13 (cont'd)
Transfers for Stone, Clay, Glass, and Concrete Products Facilities (SIC 32) in TRI, by Number of Facilities (Transfers Reported in Pounds/Year)

Chemical Name	# Facilities Reporting Chemical	POTW Disharges	Disposal	Recycling	Treatment	Energy Recovery	Total Transfers	Average Transfers per Facility
Styrene	41	12000	7203	5100	14725	8965	47993	1171
Acetone	39	0	250	2575	154131	487072	644028	16514
Dichloromethane	38	0	250	54918	9640	42517	107325	2824
Xylene (Mixed Isomers)	38	3700	131	38896	185661	1592754	1821142	47925
Methyl Ethyl Ketone	37	0	46250	7626	166934	828414	1049224	28357
Toluene	37	0	6	61276	343010	1856567	2263683	61181
Manganese	32	250	276723	3157	87940	.	368070	11502
Ethylene Glycol	30	33693	10283	5027	8426	11191	68620	2287
Glycol Ethers	30	1020	1290	.	12806	40530	55646	1855
Methanol	27	3318	600	24	114027	145100	263069	9743
Hydrogen Fluoride	25	183906	30	.	182858	.	366794	14672
Methyl Isobutyl Ketone	23	0	.	20	27409	267053	294482	12804
Ethylbenzene	21	0	.	58	4545	332311	336914	16044
Tetrachloroethylene	19	0	.	.	29111	33800	62911	3311
1,1,1-Trichloroethane	19	0	.	80082	29302	42931	152315	8017
Lead	18	32	26079	81063	7579	212	114965	6387
Antimony Compounds	16	2334	192940	1655	360	.	197289	12331
Ammonium Sulfate (Solution)	15	3428	14631	.	.	.	18059	1204
Barium	14	1790	61352	14255	220	.	77617	5544
Aluminum (Fume Or Dust)	11	0	196	.	250	.	451	41
Nickel Compounds	11	500	5633	10277	.	.	16410	1492
Chlorine	10	0	.	2733	2455	.	5188	519
Methylenebis(Phenylisocyanate)	9	0	21300	2301	692	6217	30510	3390
	8	5	.	.	372486	.	372491	46561
Nickel	8	0	6500	24000	.	.	30500	3813
Nitric Acid	8	325	9000	.	738130	.	747455	93432
1,2,4-Trimethylbenzene	8	0	.	.	1531	4880	6411	801
Benzene	7	0	0	2863	250	25453	28566	4081
Copper Compounds	7	250	5098	19500	2300	.	27148	3878
N-Butyl Alcohol	7	3400	11	.	5142	3188	11741	1677
Trichloroethylene	7	0	19550	25771	7000	18492	70813	10116
Aluminum Oxide (Fibrous Form)	6	500	105477	.	.	.	105977	17663
Arsenic Compounds	6	105	89444	47056	16	.	136621	22770
Diethanolamine	6	0	2460	.	.	1333	3793	632
Ammonium Nitrate (Solution)	5	0	.	.	.	.	0	0

Cadmium Compounds	5	0	51555	0	414	.	51969	10394
Cobalt Compounds	5	48	1287	16992	4357	.	22684	4537
O-Xylene	5	0	.	.	46	54974	55020	11004
Chloroform	4	0	0	.	10000	9500	19500	4875
Cobalt	4	0	30	37651	12700	.	50381	12595
Copper	4	0	1280	287828	5	.	289113	72278

Source: US EPA, Toxics Release Inventory Database, 1993.

Exhibit 13 (cont'd)
Transfers for Stone, Clay, Glass, and Concrete Products Facilities (SIC 32) in TRI, by Number of Facilities (Transfers Reported in Pounds/Year)

Chemical Name	# Facilities Reporting Chemical	POTW Disharges	Disposal	Recycling	Treatment	Energy Recovery	Total Transfers	Average Transfers per Facility
Di(2-Ethylhexyl) Phthalate	4	1060	7270	.	3000	.	11330	2833
Methyl Methacrylate	4	0	.	.	.	.	0	0
1,4-Dichlorobenzene	4	0	.	.	.	.	0	0
Asbestos (Friable)	3	7	45000	.	.	.	45007	15002
Butyl Benzyl Phthalate	3	2116	64688	9258	1000	.	77062	25687
Creosote	3	0	5450	.	750	.	6200	2067
Naphthalene	3	0	.	.	.	.	0	0
Sec-Butyl Alcohol	3	0	.	.	1200	.	1200	400
Zinc (Fume Or Dust)	3	250	13273	.	.	.	13523	4508
2-Ethoxyethanol	3	630	.	.	14560	33300	48490	16163
Antimony	2	0	.	750	.	.	750	375
Biphenyl	2	0	.	.	.	.	0	0
Chlorobenzene	2	0	.	.	12000	13400	25400	12700
Cumene	2	0	.	.	.	.	0	0
Cyclohexane	2	0	.	.	.	.	0	0
Decabromodiphenyl Oxide	2	0	0	.	1068	.	1068	534
Freon 113	2	0	.	.	.	.	0	0
Isopropyl Alcohol (Manufacturing	2	0	.	.	5740	3868	9608	4804
M-Xylene	2	0	.	.	44	48415	48459	24230
Propylene	2	0	.	.	.	.	0	0
Titanium Tetrachloride	2	0	.	.	.	.	0	0
1,2-Butylene Oxide	2	0	.	.	6	.	6	3
1,4-Dioxane	2	0	.	.	.	.	0	0
2-Methoxyethanol	2	0	.	.	285	940	1225	613
Acetonitrile	1	0	.	.	.	.	0	0
Aliphatic Alcohol	1	0	.	.	.	.	0	0
Allyl Alcohol	1	0	.	.	.	.	0	0
Aniline	1	0	.	.	.	.	0	0
Anthracene	1	0	.	.	.	.	0	0
Butyl Acrylate	1	0	.	.	.	.	0	0
Butyraldehyde	1	0	.	.	.	.	0	0
Cresol (Mixed Isomers)	1	0	.	.	.	.	0	0
Cyanide Compounds	1	0	.	.	.	.	0	0
Totals	**634**	**671,389**	**8,738,638**	**12,152,257**	**3,181,823**	**5,953,419**	**21,961,967**	**3,500**

Source: US EPA, Toxics Release Inventory Database, 1993.

IV.B. Summary of Selected Chemicals Released

The following is a synopsis of current scientific toxicity and fate information for the top chemicals (by weight) that facilities within this sector self-reported as released to the environment based upon 1993 TRI data. Because this section is based upon self-reported release data, it does not attempt to provide information on management practices employed by the sector to reduce the release of these chemicals. Information regarding pollutant release reductions over time may be available from EPA's TRI and 33/50 programs, or directly from the industrial trade associations that are listed in Section IX of this document. Since these descriptions are cursory, please consult the sources referenced below for a more detailed description of both the chemicals described in this section, and the chemicals that appear on the full list of TRI chemicals appearing in Section IV.A.

The brief descriptions provided below were taken from the *1993 Toxics Release Inventory Public Data Release* (EPA, 1994), the Hazardous Substances Data Bank (HSDB), and the Integrated Risk Information System (IRIS), both accessed via TOXNET[1]. The information contained below is based upon exposure assumptions that have been conducted using standard scientific procedures. The effects listed below must be taken in context of these exposure assumptions that are more fully explained within the full chemical profiles in HSDB.

The top ten chemicals released by the Stone, Clay, Glass, and Concrete Products Industry in 1993 were:

Ammonia
Formaldehyde
Hydrochloric acid
Hydrogen fluoride
Methanol
Phenol
Styrene
Sulfuric acid
Toluene
Xylene (mixed isomers)

Summaries of some of the health and environmental impacts of several of these chemicals follows:

Ammonia

Toxicity. Anhydrous ammonia is irritating to the skin, eyes, nose, throat, and upper respiratory system.

Ecologically, ammonia is a source of nitrogen (an essential element for aquatic plant growth), and may therefore contribute to eutrophication of standing or slow-moving surface water, particularly in nitrogen-limited waters such as the Chesapeake Bay. In addition, aqueous ammonia is moderately toxic to aquatic organisms.

Carcinogenicity. There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate. Ammonia combines with sulfate ions in the atmosphere and is washed out by rainfall, resulting in rapid return of ammonia to the soil and surface waters.

Ammonia is a central compound in the environmental cycling of nitrogen. Ammonia in lakes, rivers, and streams is converted to nitrate.

Physical Properties. Ammonia is a corrosive and severely irritating gas with a pungent odor.

Formaldehyde

Toxicity. Ingestion of formaldehyde leads to damage to the mucous membranes of mouth, throat, and intestinal tract; severe pain, vomiting, and diarrhea result. Inhalation of low concentrations can lead to irritation of the eyes, nose, and respiratory tract. Inhalation of high concentrations of formaldehyde causes severe damage to the respiratory system and to the heart, and may even lead to death. Other symptoms from exposure to formaldehyde include: headache, weakness, rapid heartbeat, symptoms of shock, gastroenteritis, central nervous system depression, vertigo, stupor, reduced body temperature, and coma. Repeated contact with skin promotes allergic reactions, dermatitis, irritation, and hardening. Contact with eyes causes injuries ranging from minor, transient injury to permanent blindness, depending on the concentration of the formaldehyde solution. In addition, menstrual disorders and secondary sterility have been reported in women exposed to formaldehyde.

Carcinogenicity. Formaldehyde is a probable human carcinogen via both inhalation and oral exposure, based on limited evidence in humans and sufficient evidence in animals.

Environmental Fate. Most formaldehyde is released to the environment as a gas, and is rapidly broken down by sunlight and reactions with atmospheric ions. Its initial oxidation product, formic acid, is a component of acid rain. The rest of the atmospheric formaldehyde is removed via dry deposition, rain or dissolution into surface waters. Biodegradation of formaldehyde in water takes place in a few days. Volatilization of formaldehyde dissolved in water is low. Bioaccumulation of formaldehyde does not occur.

When released onto the soil, aqueous solutions containing formaldehyde will leach through the soil. While formaldehyde is biodegradable under both aerobic and anaerobic conditions, its fate in soil and groundwater is unknown.

Although formaldehyde is found in remote areas, it is probably not transported there, but rather is likely a result of the local generation of formaldehyde from longer-lived precursors which have been transported there.

Hydrochloric Acid

Toxicity. Hydrochloric acid is primarily a concern in its aerosol form. Acid aerosols have been implicated in causing and exacerbating a variety of respiratory ailments. Dermal exposure and ingestion of highly concentrated hydrochloric acid can result in corrosivity.

Ecologically, accidental releases of solution forms of hydrochloric acid may adversely affect aquatic life by including a transient lowering of the pH (i.e., increasing the acidity) of surface waters.

Carcinogenicity. There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate. Releases of hydrochloric acid to surface waters and soils will be neutralized to an extent due to the buffering capacities of both systems. The extent of these reactions will depend on the characteristics of the specific environment.

Physical Properties. Concentrated hydrochloric acid is highly corrosive.

Methanol

Toxicity. Methanol is readily absorbed from the gastrointestinal tract and the respiratory tract, and is toxic to humans in moderate to high doses. In the body, methanol is converted into formaldehyde and formic acid. Methanol is excreted as formic acid. Observed toxic effects at high dose levels generally include central nervous system damage and blindness. Long-term exposure to high levels of methanol via inhalation cause liver and blood damage in animals.

Ecologically, methanol is expected to have low toxicity to aquatic organisms. Concentrations lethal to half the organisms of a test population are expected to exceed 1 mg methanol per liter water. Methanol is not likely to persist in water or to bioaccumulate in aquatic organisms.

Carcinogenicity. There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate. Liquid methanol is likely to evaporate when left exposed. Methanol reacts in air to produce formaldehyde which contributes to the formation of air pollutants. In the atmosphere it can react with other atmospheric chemicals or be washed out by rain. Methanol is readily degraded by microorganisms in soils and surface waters.

Physical Properties. Methanol is highly flammable.

Sulfuric Acid

Toxicity. Concentrated sulfuric acid is corrosive. In its aerosol form, sulfuric acid has been implicated in causing and exacerbating a variety of respiratory ailments.

Ecologically, accidental releases of solution forms of sulfuric acid may adversely affect aquatic life by inducing a transient lowering of the pH (i.e., increasing the acidity) of surface waters. In addition, sulfuric acid in its aerosol form is also a component of acid rain. Acid rain can cause serious damage to crops and forests.

Carcinogenicity. There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate. Releases of sulfuric acid to surface waters and soils will be neutralized to an extent due to the buffering capacities of both systems. The extent of these reactions will depend on the characteristics of the specific environment.

In the atmosphere, aerosol forms of sulfuric acid contribute to acid rain. These aerosol forms can travel large distances from the point of release before the acid is deposited on land and surface waters in the form of rain.

Toluene

Toxicity. Inhalation or ingestion of toluene can cause headaches, confusion, weakness, and memory loss. Toluene may also affect the way the kidneys and liver function.

Reactions of toluene (see environmental fate) in the atmosphere contribute to the formation of ozone in the lower atmosphere. Ozone can affect the respiratory system, especially in sensitive individuals such as asthma or allergy sufferers.

Some studies have shown that unborn animals were harmed when high levels of toluene were inhaled by their mothers, although the same effects were not seen when the mothers were fed large quantities of toluene. Note that these results may reflect similar difficulties in humans.

Carcinogenicity. There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate. The majority of releases of toluene to land and water will evaporate. Toluene may also be degraded by microorganisms. Once volatized, toluene in the lower atmosphere will react with other atmospheric components contributing to the formation of ground-level ozone and other air pollutants.

Physical Properties. Toluene is a volatile organic chemical.

Xylene (Mixed Isomers)

Toxicity. Xylenes are rapidly absorbed into the body after inhalation, ingestion, or skin contact. Short-term exposure of humans to high levels of xylenes can cause irritation of the skin, eyes, nose, and throat, difficulty in breathing, impaired lung function, impaired memory, and possible changes in the liver and kidneys. Both short- and long-term exposure to high concentrations can cause effects such as headaches, dizziness, confusion, and lack of muscle coordination. Reactions of xylenes (see environmental fate) in the atmosphere contribute to the formation of ozone in the lower atmosphere. Ozone can affect the respiratory system, especially in sensitive individuals such as asthma or allergy sufferers.

Carcinogenicity. There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate. The majority of releases to land and water will quickly evaporate, although some degradation by microorganisms will occur.

Xylenes are moderately mobile in soils and may leach into groundwater, where they may persist for several years.

Xylenes are volatile organic chemicals. As such, xylenes in the lower atmosphere will react with other atmospheric components, contributing to the formation of ground-level ozone and other air pollutants.

IV.C. Other Data Sources

The Aerometric Information Retrieval System (AIRS) contains a wide range of information related to stationary sources of air pollution, including the emissions of a number of air pollutants which may be of concern within a particular industry. With the exception of volatile organic compounds (VOCs), there is little overlap with the TRI chemicals reported above. Exhibit 14 summarizes annual releases of carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter of 10 microns or less (PM10), total particulates (PT), sulfur dioxide (SO_2), and volatile organic compounds (VOCs).

Exhibit 14
Pollutant Releases (Short Tons/Year)

Industry	CO	NO_2	PM_{10}	PT	SO_2	VOC
U.S. Total	97,208,000	23,402,000	45,489,000	7,836,000	21,888,000	23,312,000
Metal Mining	5,391	28,583	39,359	140,052	84,222	1,283
Nonmetal Mining	4,525	28,804	59,305	167,948	24,129	1,736
Lumber and Wood Products	123,756	42,658	14,135	63,761	9,149	41,423
Wood Furniture and Fixtures	2,069	2,981	2,165	3,178	1,606	59,426
Pulp and Paper	624,291	394,448	35,579	113,571	341,002	96,875
Printing	8,463	4,915	399	1,031	1,728	101,537
Inorganic Chemicals	166,147	108,575	4,107	39,082	182,189	52,091
Organic Chemicals	146,947	236,826	26,493	44,860	132,459	201,888
Petroleum Refining	419,311	380,641	18,787	36,877	648,153	309,058
Rubber and Misc. Plastic Products	2,090	11,914	2,407	5,355	29,364	140,741
Stone, Clay, Glass, and Concrete	**58,043**	**338,482**	**74,623**	**171,853**	**339,216**	**30,262**
Iron and Steel	1,518,642	138,985	42,368	83,017	238,268	82,292
Nonferrous Metals	448,758	55,658	20,074	22,490	373,007	27,375
Fabricated Metals	3,851	16,424	1,185	3,136	4,019	102,186
Electronics	367	1,129	207	293	453	4,854
Motor Vehicles, Bodies, Parts, and Accessories	35,303	23,725	2,406	12,853	25,462	101,275
Dry Cleaning	101	179	3	28	152	7,310

Source U.S. EPA Office of Air and Radiation, Airs Database, May 1995.

IV.D. Comparison of Toxic Release Inventory Between Selected Industries

The following information is presented as a comparison of pollutant release and transfer data across industrial categories. It is provided to give a general sense as to the relative scale of releases and transfers within each sector profiled under this project. Please note that the following table does not contain releases and transfers for industrial categories that are not included in this project, and thus cannot be used to draw conclusions regarding the total release and transfer amounts that are reported to TRI. Similar information is available within the annual TRI Public Data Release book.

Exhibit 15 is a graphical representation of a summary of the 1993 TRI data for the Stone, Clay, Glass and Concrete Products industry and the other sectors profiled in separate notebooks. The bar graph presents the total TRI releases and total transfers on the left axis and the triangle points show the average releases per facility on the right axis. Industry sectors are presented in the order of increasing total TRI releases. The graph is based on the data shown in Exhibit 16 and is meant to facilitate comparisons between the relative amounts of releases, transfers, and releases per facility both within and between these sectors. The reader should note, however, that differences in the proportion of facilities captured by TRI exist between industry sectors. This can be a factor of poor SIC matching and relative differences in the number of facilities reporting to TRI from the various sectors. In the case of Stone, Clay, Glass and Concrete Products industry, the 1993 TRI data presented here covers 634 facilities. These facilities listed SIC 32 Stone, Clay, Glass and Concrete Products industry as a primary SIC code.

Exhibit 15- bar graph
Summary of 1993 TRI Data: Releases and Transfers by Industry

Exhibit 16 TRI Cross Industry
Toxic Release Inventory Data for Selected Industries

Industry Sector	SIC Range	# TRI Facilities	Releases: Total Releases (10^6 pounds)	Releases: Average Releases per Facility (pounds)	Transfers: 1993 Total (10^6 pounds)	Transfers: Average Transfers per Facility (pounds)	Total Releases + Transfers (10^6 pounds)	Average Release+ Transfers per Facility (pounds)
Stone, Clay, and Concrete	32	634	26.6	41,895	2.2	3,500	28.2	46,000
Lumber and Wood Products	24	491	8.4	17,036	3.5	7,228	11.9	24,000
Furniture and Fixtures	25	313	42.2	134,883	4.2	13,455	46.4	148,000
Printing	2711-2789	318	36.5	115,000	10.2	732,000	46.7	147,000
Electronics/Computers	36	406	6.7	16,520	47.1	115,917	53.7	133,000
Rubber and Misc. Plastics	30	1,579	118.4	74,986	45.0	28,537	163.4	104,000
Motor Vehicle, Bodies, Parts and Accessories	371	609	79.3	130,158	145.5	238,938	224.8	369,000
Pulp and paper	2611-2631	309	169.7	549,000	48.4	157,080	218.1	706,000
Inorganic Chem. Mfg.	2812-2819	555	179.6	324,000	70.0	126,000	249.7	450,000
Petroleum Refining	2911	156	64.3	412,000	417.5	2,676,000	481.9	3,088,000
Fabricated Metals	34	2,363	72.0	30,476	195.7	82,802	267.7	123,000
Iron and Steel	3312-3313 3321-3325	381	85.8	225,000	609.5	1,600,000	695.3	1,825,000
Nonferrous Metals	**333, 334**	**208**	**182.5**	**877,269**	**98.2**	**472,335**	**280.7**	**1,349,000**
Organic Chemical Mfg.	2861-2869	417	151.6	364,000	286.7	688,000	438.4	1,052,000
Metal Mining	10	Industry sector not subject to TRI reporting						
Nonmetal Mining	14	Industry sector not subject to TRI reporting						
Dry Cleaning	7215, 7216, 7218	Industry sector not subject to TRI reporting						

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

V. POLLUTION PREVENTION OPPORTUNITIES

The best way to reduce pollution is to prevent it in the first place. Some companies have creatively implemented pollution prevention techniques that improve efficiency and increase profits while at the same time minimizing environmental impacts. This can be done in many ways such as reducing material inputs, re-engineering processes to reuse by-products, improving management practices, and employing substitution of toxic chemicals. Some smaller facilities are able to actually get below regulatory thresholds just by reducing pollutant releases through aggressive pollution prevention policies.

In order to encourage these approaches, this section provides general descriptions of some pollution prevention advances that have been implemented within the Stone, Clay, Glass, and Concrete Products industry. While the list is not exhaustive, it does provide core information that can be used as the starting point for facilities interested in beginning their own pollution prevention projects. When possible, this section provides information from real activities that can, or are being implemented by this sector -- including a discussion of associated costs, time frames, and expected rates of return. This section provides summary information from activities that may be, or are being implemented by this sector. When possible, information is provided that gives the context in which the techniques can be effectively used. Please note that the activities described in this section do not necessarily apply to all facilities that fall within this sector. Facility-specific conditions must be carefully considered when pollution prevention options are evaluated, and the full impacts of the change must examine how each option affects, air, land, and water pollutant releases.

Pollution prevention techniques available to this industry can be classified into the following categories: 1) source reduction, 2) recycling and reuse, and 3) improved operating practices.

The first pollution prevention technique, source reduction, includes chemical substitution and process modification options that can reduce or eliminate the use of hazardous substances and the resulting generation of hazardous waste and other environmental releases. Source reduction also includes technological improvements and process modifications to reduce or eliminate waste generation. The second pollution prevention technique, recycling and reuse, returns a waste to the manufacturing process as a raw material. The third technique, improved operating processes, relies on changes made to the way products are manufactured in order to reduce waste. The following are pollution prevention techniques for this industry.

V.A. Glass

Recycling and Reuse

In the glass manufacturing industry, one opportunity for pollution prevention is increasing the use of waste glass, or cullet, as a feedstock. The primary environmental benefit of increasing cullet use is the reduction of the amount of cullet requiring disposal. Currently, about 67 percent of all cullet is landfilled or stockpiled. Glass manufacturers typically use 30 percent cullet along with raw materials to make new glass. Increasing the use of cullet reduces energy consumption, since it requires less energy to melt cullet than to melt other raw materials. One problem with using cullet is that the composition of the cullet may vary widely from the virgin batch, leading to product quality problems. Waste glass which is not reused on site can be used in the production of road materials (known as glasphalt).

Refractory scrap from glass facilities can also be recycled. Spent refractory brick can be used as a feedstock by brick manufacturers without affecting the quality of the final product. Since refractory bricks only have to be replaced approximately every ten years, recycling of this materials is a relatively minor pollution prevention opportunity.

Glass container recycling has been increasing, from over 20 percent in 1988 to 37 percent in 1994. This recycling rate reflects the percentage of container actually recycled by manufacturers, not just the percentage collected. Recycled container glass is used in the production of new bottles and jars as well as in secondary markets such as fiberglass and glasphalt (Glass Packaging Institute, May 1995).

Improved Operating Practices

A major quantity of hazardous waste generated from glass making is generated in the receiving and delivery areas. Improvements such as clean-up and maintenance in receiving areas can minimize this waste. Keeping the receiving areas clean would allow material spills to be collected and added to the raw materials. Also, by paving receiving areas, collection and clean-up becomes much more efficient and effective and allows spilled material to be identified and separated for recycling back into the process.

Air pollution control technologies used in the glass industry commonly transfer contaminants from one media (air) to another (water or hazardous waste). Process improvements can help reduce total waste generation and improve manufacturing efficiency. One available process improvement is called "Rapid Melting Systems," which involves preheating the batch prior to melting. This practice reduces process time, energy consumption, and air emissions. The substitution of oxygen for combustion air is another process improvement which can reduce nitrogen oxide and particulate emissions. The drawbacks of using pure oxygen rather than air are its high cost and localized hot spots during combustion.

V.B. Concrete

Source Reduction

Source reduction in the concrete industry can be achieved through raw material substitution. For example, many concrete product manufacturers have moved from volatile organic compound (VOC)-mold release agents to trichloroethane (TCA)-based agents due to air quality restrictions on VOC material. However, TCA has been added to the list of ozone depleting substances and will be phased out by 2002. Concrete product manufacturers that use TCA as a mold release are working with mold release manufacturers to develop alternatives, such as water-based mold-releases.

Improved Operating Practices

Alternative cement finishing processes, including the use of water-based and powder coatings, can reduce the amount of paint-related wastes generated by manufacturers of cement products. Water-based coatings can be applied by conventional spray, airless, or air assisted airless guns. Since water has a higher density than organic solvents, overspray is reduced and transfer efficiency is improved. Powder coatings, made by mixing resins with a hardener, pigments, and other additives, are 100 percent solids that are applied to parts of various shapes, sizes, and materials of construction. Transfer efficiencies in powder coating application are high, and no solvents are used in manufacturing or applying the coatings. Paint that does not adhere to the workpiece is collected and reused. Consequently, there are virtually no emissions and very little waste from powder coating systems. Powder coating systems require new application equipment, which can be a major capital cost for some companies.

V.C. Cement

Cement kiln dust is the largest waste stream produced by cement manufacturers. The following discussion therefore focuses primarily on pollution prevention opportunities in the cement industry as they relate to cement kiln dust. Pollution prevention opportunities discussed below reflect EPA's findings in the 1993 Report to Congress on Cement Kiln Dust.

Source Reduction

One approach to pollution prevention in the cement industry is to minimize the production of cement kiln dust. There are three primary means to decrease the amount of dust generated by a kiln. Dust can be minimized by reducing gas turbulence in the kiln and avoiding excessive flow velocities. The use of chains near the cool end of the kiln can also minimize dust by trapping the dust before it is released in the kiln exhaust. Most kilns are already equipped with such cool-end chain sections. The use of fuels with a low ash content, such as liquid hazardous wastes, can also reduce the amount of cement kiln dust generated.

Recycling and Reuse

Cement kiln dust generated from the baghouse dust collectors can be reused both on-site and off-site. Direct return of dust to the kiln is a common recycling practice. The dust may be returned to the hot end, to the middle of the kiln, or to the feed material. However, cement kiln dust can only be reused if contaminant concentrations fall within specified limits, because clinker quality can be affected by the presence of certain constituents. Alkali metals, such as lithium, sodium, and potassium, are of primary concern. The raw materials used to produce clinker and the kiln fuel influence the chemical composition of the dust generated, and thus may affect recycling rates.

Cement kiln dust that contains alkalis or possesses other undesirable characteristics may be treated so that it can be returned to the kiln system. Treatment techniques include pelletizing, leaching with water or a potassium chloride solution to remove alkali salts, alkali volatilization, recovery scrubbing (also known as flue gas desulfurization), and fluid bed dust recovery.

In addition to reintroduction to the kiln, cement kiln dust can be reused beneficially in a variety of ways. Cement kiln dust has been sold by some plants for sewage sludge solidification. It has also been reused as an adsorbent for desulfurization, particularly in the cement plant's air pollution control equipment; as a neutralization agent for acidic materials; as a soil stabilizer; and as an ingredient in various agricultural and construction products. Material accumulated from desulfurization can be ground and reused as an additive and/or retarding additive to the clinker to make cement.

Wastes generated from other industries can be recycled at cement kilns as fuels and raw material substitutes. The recycling of wastes in cement kilns as fuel offers a cost-effective, safe, and environmentally sound method of resource recovery for some hazardous and non-hazardous waste materials. Currently used hazardous wastes are waste oils and spent organic solvents, sludges, and solids from the paint and coatings, auto and truck assembly, and petroleum industries. Some non-hazardous wastes, including foundry sand and contaminated soils, have high concentrations of the conventional components of cement, such as silicon, aluminum, and iron. These wastes, therefore, can be used in place of the conventional raw materials.

Improved Operating Practices

Cement manufacturers who have laboratories in-house to conduct product testing and research often generate hazardous wastes as a result of laboratory testing and research. Approximately 40 percent of the hazardous wastes generated in a lab are due to unused and off-spec reagent chemicals. Traditionally, reagents are purchased in large quantities, but laboratory technicians prefer to use fresh reagents for experiments, and therefore tend not to use reagents in previously opened containers. This leads to large quantities of unused reagents. Implementing a purchasing and inventory control, surplus chemicals exchange, and experiment modification system at laboratories would reduce the amount of unused reagents that need to be disposed of as wastes. Purchasing only the required amounts or smaller container sizes of reagents will also reduce reagent waste and disposal costs.

Gaseous emissions from cement manufacturing plants are mainly nitrogen oxides and sulfur dioxide. Process controls, including balancing the alkali content in raw materials and fuels, increasing oxygen partial pressure, increasing dust load, and reducing kiln volume load, can reduce sulfur emissions in the process. Process controls to reduce nitrogen oxide emissions include avoiding excessive sintering temperatures and staged combustion in the calciner. Other measures may reduce emissions, including the use of ammonia to control nitrogen oxide emissions.

V.D. Structural Clay Products

Recycling and Reuse

Reuse of wastes generated by air pollution control equipment is one pollution prevention opportunity available to facilities which produce structural clay products. Clay product manufacturers commonly use wet scrubbing to treat particulate emissions. The waste generated by wet scrubbers can often be returned to the production process as a raw material substitute to replace clay or other alkaline additives.

Improved Operating Practices

Waste generated during raw materials receiving can be eliminated by modifying the equipment and operating practices. For example, paved receiving areas prevent spilled raw materials from contaminating soil, allowing spilled materials to be recaptured for use.

V.E. Pottery Products

Source Reduction

Product substitution is one means of reducing paint waste generated by plants engaged in finishing of pottery products. Water-based finishes, including paints and enamels, can be substituted for solvent-based finishes, reducing the amount of volatile emissions from finishing processes. The use of water-based finishes may, however, result in hazardous waste generation and waste water discharges.

Recycling and Reuse

Pottery manufacturers can recycle wastes recovered from pollution control devices. The dry powder waste recovered from air pollution control equipment is virtually identical in composition to the tile/ceramic product itself, and therefore may be recycled as raw materials into the body preparation process. The overspray dust gathered in dust collectors can also be recovered. Enamel overspray from finishing operations can also be reused if not contaminated. Enamel overspray is often washed down and collected in settling pits, where it can be reclaimed and re-introduced as a raw material.

VI. SUMMARY OF FEDERAL STATUTES AND REGULATIONS

This section discusses the Federal statutes and regulations that may apply to this sector. The purpose of this section is to highlight, and briefly describe the applicable Federal requirements, and to provide citations for more detailed information. The three following sections are included.

- Section VI.A contains a general overview of major statutes
- Section VI.B contains a list of regulations specific to this industry
- Section VI.C contains a list of pending and proposed regulations

The descriptions within Section IV are intended solely for general information. Depending upon the nature or scope of the activities at a particular facility, these summaries may or may not necessarily describe all applicable environmental requirements. Moreover, they do not constitute formal interpretations or clarifications of the statutes and regulations. For further information, readers should consult the Code of Federal Regulations and other state or local regulatory agencies. EPA Hotline contacts are also provided for each major statute.

VI.A. General Description of Major Statutes

Resource Conservation And Recovery Act

The Resource Conservation And Recovery Act (RCRA) of 1976 which amended the Solid Waste Disposal Act, addresses solid (Subtitle D) and hazardous (Subtitle C) waste management activities. The Hazardous and Solid Waste Amendments (HSWA) of 1984 strengthened RCRA's waste management provisions and added Subtitle I, which governs underground storage tanks (USTs).

Regulations promulgated pursuant to Subtitle C of RCRA (40 CFR Parts 260-299) establish a "cradle-to-grave" system governing hazardous waste from the point of generation to disposal. RCRA hazardous wastes include the specific materials listed in the regulations (commercial chemical products, designated with the code "P" or "U"; hazardous wastes from specific industries/sources, designated with the code "K"; or hazardous wastes from non-specific sources, designated with the code "F") or materials which exhibit a hazardous waste characteristic (ignitibility, corrosivity, reactivity, or toxicity and designated with the code "D").

Regulated entities that generate hazardous waste are subject to waste accumulation, manifesting, and recordkeeping standards. Facilities that treat, store, or dispose of hazardous waste must obtain a permit, either from EPA or from a State agency which EPA has authorized to implement the permitting program. Subtitle C permits contain general facility standards such as contingency plans, emergency procedures, recordkeeping and reporting requirements, financial assurance mechanisms, and unit-specific standards. RCRA also contains provisions (40 CFR Part 264 Subpart S and §264.10) for conducting corrective actions which govern the cleanup of releases of hazardous waste or constituents from solid waste management units at RCRA-regulated facilities.

Although RCRA is a Federal statute, many States implement the RCRA program. Currently, EPA has delegated its authority to implement various provisions of RCRA to 46 of the 50 States.

Most RCRA requirements are not industry specific but apply to any company that transports, treats, stores, or disposes of hazardous waste. Here are some important RCRA regulatory requirements:

- **Identification of Solid and Hazardous Wastes** (40 CFR Part 261) lays out the procedure every generator should follow to determine whether the material created is considered a hazardous waste, solid waste, or is exempted from regulation.
- **Standards for Generators of Hazardous Waste** (40 CFR Part 262) establishes the responsibilities of hazardous waste generators including obtaining an ID number, preparing a manifest, ensuring proper packaging and labeling, meeting standards for waste accumulation units, and recordkeeping and reporting requirements. Generators can accumulate hazardous waste for up to 90 days (or 180 days depending on the amount of waste generated) without obtaining a permit.
- **Land Disposal Restrictions** (LDRs) are regulations prohibiting the disposal of hazardous waste on land without prior treatment. Under the LDRs (40 CFR 268), materials must meet land disposal restriction (LDR) treatment standards prior to placement in a RCRA land disposal unit (landfill, land treatment unit, waste pile, or surface impoundment). Wastes subject to the LDRs include solvents, electroplating wastes, heavy metals, and acids. Generators of waste subject to the LDRs must provide notification of such to the designated TSD facility to ensure proper treatment prior to disposal.
- **Used Oil Management Standards** (40 CFR Part 279) impose management requirements affecting the storage, transportation, burning, processing, and re-refining of the used oil. For parties that merely generate used oil, regulations establish storage standards. For a party considered a used oil marketer (one who generates and sells off-specification used oil directly to a used oil burner), additional tracking and paperwork requirements must

be satisfied.

- **Tanks and Containers** used to store hazardous waste with a high volatile organic concentration must meet emission standards under RCRA. Regulations (40 CFR Part 264-265, Subpart CC) require generators to test the waste to determine the concentration of the waste, to satisfy tank and container emissions standards, and to inspect and monitor regulated units. These regulations apply to all facilities who store such waste, including generators operating under the 90-day accumulation rule.

- **Underground Storage Tanks** (USTs) containing petroleum and hazardous substance are regulated under Subtitle I of RCRA. Subtitle I regulations (40 CFR Part 280) contain tank design and release detection requirements, as well as financial responsibility and corrective action standards for USTs. The UST program also establishes increasingly stringent standards, including upgrade requirements for existing tanks, that must be met by 1998.

- **Boilers and Industrial Furnaces** (BIFs) that use or burn fuel containing hazardous waste must comply with strict design and operating standards. BIF regulations (40 CFR Part 266, Subpart H) address unit design, provide performance standards, require emissions monitoring, and restrict the type of waste that may be burned.

EPA's RCRA/Superfund/UST Hotline, at (800) 424-9346, responds to questions and distributes guidance regarding all RCRA regulations. The RCRA Hotline operates weekdays from 8:30 a.m. to 7:30 p.m., EST, excluding Federal holidays.

Comprehensive Environmental Response, Compensation, And Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), a 1980 law commonly known as Superfund, authorizes EPA to respond to releases, or threatened releases, of hazardous substances that may endanger public health, welfare, or the environment. CERCLA also enables EPA to force parties responsible for environmental contamination to clean it up or to reimburse the Superfund for response costs incurred by EPA. The Superfund Amendments and Reauthorization Act (SARA) of 1986 revised various sections of CERCLA, extended the taxing authority for the Superfund, and created a free-standing law, SARA Title III, also known as the Emergency Planning and Community Right-to-Know Act (EPCRA).

The CERCLA **hazardous substance release reporting regulations** (40 CFR Part 302) direct the person in charge of a facility to report to the National Response Center (NRC) any environmental release of a hazardous substance which exceeds a reportable quantity. Reportable quantities are defined and listed in 40 CFR §

302.4. A release report may trigger a response by EPA, or by one or more Federal or State emergency response authorities.

EPA implements **hazardous substance responses** according to procedures outlined in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300). The NCP includes provisions for permanent cleanups, known as remedial actions, and other cleanups referred to as "removals." EPA generally takes remedial actions only at sites on the National Priorities List (NPL), which currently includes approximately 1300 sites. Both EPA and states can act at other sites; however, EPA provides responsible parties the opportunity to conduct removal and remedial actions and encourages community involvement throughout the Superfund response process.

EPA's RCRA/Superfund/UST Hotline, at (800) 424-9346, answers questions and references guidance pertaining to the Superfund program. The CERCLA Hotline operates weekdays from 8:30 a.m. to 7:30 p.m., EST, excluding Federal holidays.

Emergency Planning And Community Right-To-Know Act

The Superfund Amendments and Reauthorization Act (SARA) of 1986 created the Emergency Planning and Community Right-to-Know Act (EPCRA, also known as SARA Title III), a statute designed to improve community access to information about chemical hazards and to facilitate the development of chemical emergency response plans by State and local governments. EPCRA required the establishment of State emergency response commissions (SERCs), responsible for coordinating certain emergency response activities and for appointing local emergency planning committees (LEPCs).

EPCRA and the EPCRA regulations (40 CFR Parts 350-372) establish four types of reporting obligations for facilities which store or manage specified chemicals:

- **EPCRA §302** requires facilities to notify the SERC and LEPC of the presence of any "extremely hazardous substance" (the list of such substances is in 40 CFR Part 355, Appendices A and B) if it has such substance in excess of the substance's threshold planning quantity, and directs the facility to appoint an emergency response coordinator.

- **EPCRA §304** requires the facility to notify the SERC and the LEPC in the event of a release exceeding the reportable quantity of a CERCLA hazardous substance or an EPCRA extremely hazardous substance.

- **EPCRA §§311 and 312** require a facility at which a hazardous chemical, as defined by the Occupational Safety and Health Act, is present in an amount exceeding a specified threshold to submit to the SERC, LEPC, and local fire department material safety data sheets (MSDSs) or lists of

MSDSs and hazardous chemical inventory forms (also known as Tier I and II forms). This information helps the local government respond in the event of a spill or release of the chemical.

- **EPCRA §313** requires manufacturing facilities included in SIC codes 20 through 39, which have ten or more employees, and which manufacture, process, or use specified chemicals in amounts greater than threshold quantities, to submit an annual toxic chemical release report. This report, commonly known as the Form R, covers releases and transfers of toxic chemicals to various facilities and environmental media, and allows EPA to compile the national Toxic Release Inventory (TRI) database.

All information submitted pursuant to EPCRA regulations is publicly accessible, unless protected by a trade secret claim.

EPA's EPCRA Hotline, at (800) 535-0202, answers questions and distributes guidance regarding the emergency planning and community right-to-know regulations. The EPCRA Hotline operates weekdays from 8:30 a.m. to 7:30 p.m., EST, excluding Federal holidays.

Clean Water Act

The primary objective of the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA), is to restore and maintain the chemical, physical, and biological integrity of the nation's surface waters. Pollutants regulated under the CWA include "priority" pollutants, including various toxic pollutants; "conventional" pollutants, such as biochemical oxygen demand (BOD), total suspended solids (TSS), fecal coliform, oil and grease, and pH; and "non-conventional" pollutants, including any pollutant not identified as either conventional or priority.

The CWA regulates both direct and indirect discharges. The **National Pollutant Discharge Elimination System (NPDES)** program (CWA §402) controls direct discharges into navigable waters. Direct discharges or "point source" discharges are from sources such as pipes and sewers. NPDES permits, issued by either EPA or an authorized State (EPA has presently authorized forty States to administer the NPDES program), contain industry-specific, technology-based and/or water quality-based limits, and establish pollutant monitoring and reporting requirements. A facility that intends to discharge into the nation's waters must obtain a permit prior to initiating its discharge. A permit applicant must provide quantitative analytical data identifying the types of pollutants present in the facility's effluent. The permit will then set forth the conditions and effluent limitations under which a facility may make a discharge.

A NPDES permit may also include discharge limits based on Federal or State water quality criteria or standards, that were designed to protect designated uses of surface waters, such as supporting aquatic life or recreation. These standards, unlike the technological standards, generally do not take into account technological feasibility or costs. Water quality criteria and standards vary from State to State, and site to site, depending on the use classification of the receiving body of water. Most States follow EPA guidelines which propose aquatic life and human health criteria for many of the 126 priority pollutants.

Storm Water Discharges

In 1987 the CWA was amended to require EPA to establish a program to address **storm water discharges**. In response, EPA promulgated the NPDES storm water permit application regulations. Storm water discharge associated with industrial activity means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing or raw materials storage areas at an industrial plant (40 CFR 122.26(b)(14)). These regulations require that facilities with the following storm water discharges apply for a NPDES permit: (1) a discharge associated with industrial activity; (2) a discharge from a large or medium municipal storm sewer system; or (3) a discharge which EPA or the State determines to contribute to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United States.

The term "storm water discharge associated with industrial activity" means a storm water discharge from one of 11 categories of industrial activity defined at 40 CFR 122.26. Six of the categories are defined by SIC codes while the other five are identified through narrative descriptions of the regulated industrial activity. If the primary SIC code of the facility is one of those identified in the regulations, the facility is subject to the storm water permit application requirements. If any activity at a facility is covered by one of the five narrative categories, storm water discharges from those areas where the activities occur are subject to storm water discharge permit application requirements.

Those facilities/activities that are subject to storm water discharge permit application requirements are identified below. To determine whether a particular facility falls within one of these categories, the regulation should be consulted.

Category i: Facilities subject to storm water effluent guidelines, new source performance standards, or toxic pollutant effluent standards.

Category ii: Facilities classified as SIC 24-lumber and wood products (except wood kitchen cabinets); SIC 26-paper and allied products (except paperboard containers and products); SIC 28-chemicals and allied products (except drugs and paints); SIC 29-petroleum refining; and SIC 311-leather tanning and finishing.

Category iii: Facilities classified as SIC 10-metal mining; SIC 12-coal mining; SIC 13-oil and gas extraction; and SIC 14-nonmetallic mineral mining.

Category iv: Hazardous waste treatment, storage, or disposal facilities.

Category v: Landfills, land application sites, and open dumps that receive or have received industrial wastes.

Category vi: Facilities classified as SIC 5015-used motor vehicle parts; and SIC 5093-automotive scrap and waste material recycling facilities.

Category vii: Steam electric power generating facilities.

Category viii: Facilities classified as SIC 40-railroad transportation; SIC 41-local passenger transportation; SIC 42-trucking and warehousing (except public warehousing and storage); SIC 43-U.S. Postal Service; SIC 44-water transportation; SIC 45-transportation by air; and SIC 5171-petroleum bulk storage stations and terminals.

Category ix: Sewage treatment works.

Category x: Construction activities except operations that result in the disturbance of less than five acres of total land area.

Category xi: Facilities classified as SIC 20-food and kindred products; SIC 21-tobacco products; SIC 22-textile mill products; SIC 23-apparel related products; SIC 2434-wood kitchen cabinets manufacturing; SIC 25-furniture and fixtures; SIC 265-paperboard containers and boxes; SIC 267-converted paper and paperboard products; SIC 27-printing, publishing, and allied industries; SIC 283-drugs; SIC 285-paints, varnishes, lacquer, enamels, and allied products; SIC 30-rubber and plastics; SIC 31-leather and leather products (except leather and tanning and finishing); SIC 323-glass products; SIC 34-fabricated metal products (except fabricated structural metal); SIC 35-industrial and commercial machinery and computer equipment; SIC 36-electronic and other electrical equipment and components; SIC 37-transportation equipment (except ship and boat building and repairing); SIC 38-measuring, analyzing, and controlling instruments; SIC 39-miscellaneous manufacturing industries; and SIC 4221-4225-public warehousing and storage.

Pretreatment Program

Another type of discharge that is regulated by the CWA is one that goes to a publicly-owned treatment works (POTWs). The national **pretreatment program** (CWA §307(b)) controls the indirect discharge of pollutants to POTWs by "industrial users." Facilities regulated under §307(b) must meet certain pretreatment standards. The goal of the pretreatment program is to protect municipal wastewater treatment plants from damage that may occur when hazardous, toxic, or other wastes are discharged into a sewer system and to protect the quality of sludge generated by these plants. Discharges to a POTW are regulated primarily by the POTW itself, rather than the State or EPA.

EPA has developed technology-based standards for industrial users of POTWs. Different standards apply to existing and new sources within each category. "Categorical" pretreatment standards applicable to an industry on a nationwide basis are developed by EPA. In addition, another kind of pretreatment standard, "local limits," are developed by the POTW in order to assist the POTW in achieving the effluent limitations in its NPDES permit.

Regardless of whether a State is authorized to implement either the NPDES or the pretreatment program, if it develops its own program, it may enforce requirements more stringent than Federal standards.

EPA's Office of Water, at (202) 260-5700, will direct callers with questions about the CWA to the appropriate EPA office. EPA also maintains a bibliographic database of Office of Water publications which can be accessed through the Ground Water and Drinking Water resource center, at (202) 260-7786.

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) mandates that EPA establish regulations to protect human health from contaminants in drinking water. The law authorizes EPA to develop national drinking water standards and to create a joint Federal-State system to ensure compliance with these standards. The SDWA also directs EPA to protect underground sources of drinking water through the control of underground injection of liquid wastes.

EPA has developed primary and secondary drinking water standards under its SDWA authority. EPA and authorized States enforce the primary drinking water standards, which are, contaminant-specific concentration limits that apply to certain public drinking water supplies. Primary drinking water standards consist of maximum contaminant level goals (MCLGs), which are non-enforceable health-based goals, and maximum contaminant levels (MCLs), which are enforceable limits set as close to MCLGs as possible, considering cost and feasibility of attainment.

The SDWA **Underground Injection Control (UIC)** program (40 CFR Parts 144-

148) is a permit program which protects underground sources of drinking water by regulating five classes of injection wells. UIC permits include design, operating, inspection, and monitoring requirements. Wells used to inject hazardous wastes must also comply with RCRA corrective action standards in order to be granted a RCRA permit, and must meet applicable RCRA land disposal restrictions standards. The UIC permit program is primarily State-enforced, since EPA has authorized all but a few States to administer the program.

The SDWA also provides for a Federally-implemented Sole Source Aquifer program, which prohibits Federal funds from being expended on projects that may contaminate the sole or principal source of drinking water for a given area, and for a State-implemented Wellhead Protection program, designed to protect drinking water wells and drinking water recharge areas.

EPA's Safe Drinking Water Hotline, at (800) 426-4791, answers questions and distributes guidance pertaining to SDWA standards. The Hotline operates from 9:00 a.m. through 5:30 p.m., EST, excluding Federal holidays.

Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) granted EPA authority to create a regulatory framework to collect data on chemicals in order to evaluate, assess, mitigate, and control risks which may be posed by their manufacture, processing, and use. TSCA provides a variety of control methods to prevent chemicals from posing unreasonable risk.

TSCA standards may apply at any point during a chemical's life cycle. Under TSCA §5, EPA has established an inventory of chemical substances. If a chemical is not already on the inventory, and has not been excluded by TSCA, a premanufacture notice (PMN) must be submitted to EPA prior to manufacture or import. The PMN must identify the chemical and provide available information on health and environmental effects. If available data are not sufficient to evaluate the chemical's effects, EPA can impose restrictions pending the development of information on its health and environmental effects. EPA can also restrict significant new uses of chemicals based upon factors such as the projected volume and use of the chemical.

Under TSCA §6, EPA can ban the manufacture or distribution in commerce, limit the use, require labeling, or place other restrictions on chemicals that pose unreasonable risks. Among the chemicals EPA regulates under §6 authority are asbestos, chlorofluorocarbons (CFCs), and polychlorinated biphenyls (PCBs).

EPA's TSCA Assistance Information Service, at (202) 554-1404, answers questions and distributes guidance pertaining to Toxic Substances Control Act standards.

The Service operates from 8:30 a.m. through 4:30 p.m., EST, excluding Federal holidays.

Clean Air Act

The Clean Air Act (CAA) and its amendments, including the Clean Air Act Amendments (CAAA) of 1990, are designed to "protect and enhance the nation's air resources so as to promote the public health and welfare and the productive capacity of the population." The CAA consists of six sections, known as Titles, which direct EPA to establish national standards for ambient air quality and for EPA and the States to implement, maintain, and enforce these standards through a variety of mechanisms. Under the CAAA, many facilities will be required to obtain permits for the first time. State and local governments oversee, manage, and enforce many of the requirements of the CAAA. CAA regulations appear at 40 CFR Parts 50-99.

Pursuant to Title I of the CAA, EPA has established national ambient air quality standards (NAAQSs) to limit levels of "criteria pollutants," including carbon monoxide, lead, nitrogen dioxide, particulate matter, ozone, and sulfur dioxide. Geographic areas that meet NAAQSs for a given pollutant are classified as attainment areas; those that do not meet NAAQSs are classified as non-attainment areas. Under §110 of the CAA, each State must develop a State Implementation Plan (SIP) to identify sources of air pollution and to determine what reductions are required to meet Federal air quality standards.

Title I also authorizes EPA to establish New Source Performance Standards (NSPSs), which are nationally uniform emission standards for new stationary sources falling within particular industrial categories. NSPSs are based on the pollution control technology available to that category of industrial source but allow the affected industries the flexibility to devise a cost-effective means of reducing emissions.

Under Title I, EPA establishes and enforces National Emission Standards for Hazardous Air Pollutants (NESHAPs), nationally uniform standards oriented towards controlling particular hazardous air pollutants (HAPs). Title III of the CAAA further directed EPA to develop a list of sources that emit any of 189 HAPs, and to develop regulations for these categories of sources. To date EPA has listed 174 categories and developed a schedule for the establishment of emission standards. The emission standards will be developed for both new and existing sources based on "maximum achievable control technology" (MACT). The MACT is defined as the control technology achieving the maximum degree of reduction in the emission of the HAPs, taking into account cost and other factors.

Title II of the CAA pertains to mobile sources, such as cars, trucks, buses, and planes. Reformulated gasoline, automobile pollution control devices, and vapor recovery nozzles on gas pumps are a few of the mechanisms EPA uses to regulate mobile air emission sources.

Title IV establishes a sulfur dioxide emissions program designed to reduce the formation of acid rain. Reduction of sulfur dioxide releases will be obtained by granting to certain sources limited emissions allowances, which, beginning in 1995, will be set below previous levels of sulfur dioxide releases.

Title V of the CAAA of 1990 created a permit program for all "major sources" (and certain other sources) regulated under the CAA. One purpose of the operating permit is to include in a single document all air emissions requirements that apply to a given facility. States are developing the permit programs in accordance with guidance and regulations from EPA. Once a State program is approved by EPA, permits will be issued and monitored by that State.

Title VI is intended to protect stratospheric ozone by phasing out the manufacture of ozone-depleting chemicals and restrict their use and distribution. Production of Class I substances, including 15 kinds of chlorofluorocarbons (CFCs), will be phased out entirely by the year 2000, while certain hydrochlorofluorocarbons (HCFCs) will be phased out by 2030.

EPA's Control Technology Center, at (919) 541-0800, provides general assistance and information on CAA standards. The Stratospheric Ozone Information Hotline, at (800) 296-1996, provides general information about regulations promulgated under Title VI of the CAA, and EPA's EPCRA Hotline, at (800) 535-0202, answers questions about accidental release prevention under CAA §112(r). In addition, the Technology Transfer Network Bulletin Board System (modem access (919) 541-5742)) includes recent CAA rules, EPA guidance documents, and updates of EPA activities.

VI.B. Industry-Specific Regulations

Clean Air Act (CAA)

In addition to the general applicable requirements of the CAA, the industries covered by SIC 32 are subject to the following specific regulatory requirements:

- Standards of Performance for Portland Cement Plants (40_CFR_60.60 Subpart_F) which regulates emissions of particulate matter through the operation of a kiln, clinker cooler, raw mill system, finish mill system, raw mill dryer, raw material storage, clinker storage, finished product storage, conveyor transfer points, bagging and bulk loading and unloading systems.

- Standards of Performance for Asphalt Concrete Plants (40 CFR 60.90 Subpart I) which regulates emissions of particulate matter.

- Standards of Performance for Glass Manufacturing Plants (40 CFR 60.290 Subpart CC) which regulates emissions of particulate matter from glass melting furnaces.

- Standards of Performance for Lime Manufacturing Plants (40 CFR 60.340 Subpart HH) which regulates emissions of particulate matter from rotary lime kilns.

- Standards of Performance for Asphalt Processing and Asphalt Roofing Manufacture (40 CFR 60.470 Subpart UU) which regulates emissions of particulate matter by each saturator and each mineral handling and storage facility at asphalt roofing plants; and each asphalt storage tank and each blowing still at asphalt processing plants, petroleum refineries, and asphalt roofing plants.

- Standard of Performance for Wool Fiberglass Insulation Manufacturing Plants (40 CFR 60.680 Subpart PPP) which regulates emissions of particulate matter by rotary spin wool fiberglass insulation manufacturers.

- Standards of Performance for Polymeric Coating of Supporting Substrates Facilities (40 CFR 60.740 Subpart VVV) which regulates emissions of volatile organic compounds.

- National Emission Standard for Inorganic Arsenic Emissions from Glass Manufacturing Plants (40 CFR 61.160 Subpart N) which regulates emissions of arsenic. This subpart applies to glass melting furnaces that use commercial arsenic as a raw material.

The performance standards set out above also impose specific emissions monitoring, testing methods and procedures, recordkeeping, and reporting requirements.

Clean Water Act (CWA)

In addition to the general applicable requirements of the CWA, the industries covered by SIC 32 are subject to the following specific regulatory requirements:

- EPA Effluent Guidelines and Standards for Cement Manufacturing (40_CFR_411) regulate discharges resulting from the process in which several mineral ingredients are used in manufacturing cement and in which: 1) kiln dust is not contracted with water as an integral part of the process and water is not used in wet scrubbers to control kiln stack emissions (non-leaching plants); and 2) kiln dust is contracted with water as an integral part of the process and water is used in wet scrubbers to control kiln stack emissions (leaching plants).

- EPA Effluent Guidelines and Standards for Glass Manufacturing, Insulation Fiberglass Subcategory (40 CFR 426) which regulates the discharge of process wastewater as a result of the manufacture of insulation fiberglass.

- EPA Effluent Guidelines and Standards for Asbestos Manufacturing (40_CFR_427) which regulate discharges of asbestos in process wastewater resulting from the manufacture of asbestos products including: asbestos-cement pipe, asbestos-cement sheet, asbestos paper with starch binder, asbestos paper with elastomeric binder, asbestos millboard, asbestos roofing products, and asbestos floor tile.

- EPA Effluent Guidelines and Standards for Paving and Roofing Materials (Tars and Asphalt) (40_CFR 443) which regulate discharges of wastewater within the asphalt emulsion, asphalt concrete, linoleum and printed asphalt felt, and paving and roofing materials (tars and asphalt) subcategories of the paving and roofing materials (tars and asphalt) category of point sources.

The effluent guidelines set out above contain pretreatment standards based upon application of best practicable control technology or best available control technology.

VI.C. Pending and Proposed Regulatory Requirements

Clean Air Act Amendments of 1990 (CAAA)

EPA is required to publish an initial list of all categories of major and area sources of the hazardous air pollutants (HAPs) listed in Section 112(b) of the CAAA, establish dates for the promulgation of emission standards for each of the listed categories of HAP emission sources, and develop emission standards for each source of HAPs such that the schedule is met. The standards are to be technology-based and are to require the maximum degree of emission reduction determined to be achievable by the Administrator. The Agency has determined that the mineral wool production industry and the portland cement manufacturing industry may be anticipated to emit several of the 189 HAPs listed in Section 112(b) of the CAAA. As a consequence, these source categories are included on the initial list of HAP-emitting categories scheduled for standards promulgation within seven years of enactment of the CAAA.

Report to Congress and Final Regulatory Determination on Cement Kiln Dust (RCRA)

RCRA 8002(o) requires that EPA study and report to Congress on the sources and volumes of cement kiln dust, current and alternative waste management practices and their costs and economic impacts, documented damages to human health and the environment from cement kiln dust disposal, and existing State and Federal regulation of these wastes. The Agency published the Report to Congress on Cement Kiln Dust in December 1993, and concluded in February 1995 that additional control of cement kiln dust is warranted to protect human health and the environment (60 FR 7366; February 7, 1995). EPA intends to address regulation of cement kiln dust through a “common sense” approach by developing RCRA disposal requirements to protect groundwater and by regulating fugitive emissions under the CAA. Until such regulations are implemented, cement kiln dust will retain its status as non-hazardous waste.